AMSAT News Service Weekly Bulletins
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AMSAT NEWS SERVICE
ANS-106

ANS is a free, weekly, news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

Please send any amateur satellite news or reports to:
ans-editor@amsat.org

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* Volunteers are needed to help at the AMSAT booth at Dayton. Gould *
* WA4SXM, is looking for volunteers to help man the AMSAT booth dur- *
* ing the 2012 Hamvention. People are needed all 3 days for 2 hour *
* shifts. Please send the days and times you are available to help *
* as well as how many shifts you are willing to work via e-mail to *
* wa4sxm at amsat.org. *
* Monitor http://www.amsat.org/amsat-new/hamvention/2012/Dayton.php *
* for the latest AMSAT at Dayton news and developments *
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SB SAT @ AMSAT $ANS-106.01
ANS-099 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 106.01
>From AMSAT HQ SILVER SPRING, MD.
April 15, 2012
To All RADIO AMATEURS
BID: $ANS-106.01

New Features at the AMSAT Booth at Dayton 2012

The 2012 Dayton Hamvention, sponsored by the Dayton Amateur Radio Association will be held this year on May 18-20, 2012. AMSAT will occupy the same booths (444-449) in Ball Arena, right across from the ARRL area and just inside the door from the Satellite Demonstration area. Plan to visit all of the AMSAT activities!

The AMSAT booth will feature AMSAT Engineering, new publications, new apparel, amateur satellite hardware and software. The AMSAT

Forum will be on Saturday May 19.

All of the latest AMSAT at Dayton information is posted on-line at:
http://www.amsat.org/amsat-new/hamvention/2012/Dayton.php

Engineering

We will have an engineering model of the 1U Cubesat Fox, the operational ARISSat prototype, Fox telemetry display and the Penn State student experiment for Fox.

New Publications

2012 Getting Started with Amateur Satellites
2012 Laminated Frequency Card

New Apparel

White golf shirt with AMSAT Fox logo
White baseball cap with AMSAT Fox logo
Tee shirt with Fox satellite design and Fox logo

Hardware

ELK Antennas and optional covers
LVB Tracker boxes

Software

Latest version of SatPC32

If you renew your AMSAT membership at the AMSAT booth you will receive an AMSAT insulated stainless steel coffee mug.

AMSAT Hotel

The cutoff date to book a room with the AMSAT group is April 20. The hotel is the Country Inn and the cost of the room (with 2 Queen Beds) is $99. If you are interested in staying with the AMSAT at Dayton, please call Martha at the AMSAT Office at 301-589-6062.

AMSAT/TAPR Friday Night Banquet

AMSAT/TAPR Banquet on Friday night, May 18 is one of the main AMSAT activities during the 2012 Hamvention at Dayton.

AMSAT is pleased to announce that Howard Long, G6LVB will be the featured speaker for the evening event. Howard will be talking about his FUNcube Dongle, the 64 - 1700 MHz Software Defined Receiver. This innovative USB device is the size of a thumbdrive and has an SMA antenna socket. Multiple SDR control and display software programs can be used with the FUNcube Dongle.

Banquet tickets will not be sold at the AMSAT booth during the Hamvention so reservations must be made through the AMSAT Store:
http://www.amsat-na.com/store/item.php?id0158
Tickets are $30 apiece.

ARISS Mentor Introduction at Dayton 2012

AMSAT and ARRL are teaming up during the 2012 Hamvention to recruit new ARISS (Amateur Radio on the International Space Station) Technical Mentors and Ground Station Operators.

Friday and Saturday (May 18 & 19) at 4pm in the ARRL stage area AMSAT Vice President for Educational Relations Mark Hammond N8MH will explain the need for additional ARISS Technical Mentors and Ground Station Operators and the requirements and responsibilities needed to help provide a reliable conversation between astronauts and selected schools or groups.

Technical Mentors serve as an advising and coordinating liaison between NASA, the school or group making the ARISS contact, and the Ground Station Operators, who set up the satellite station at the contact location. We encourage anyone interested in helping make future school contacts with the ISS successful to please attend.

AMSAT to Facilitate Student Satellite Contacts

AMSAT is encouraging all students attending the 2012 Dayton Hamvention to come by the Satellite Demonstration Area just outside of the Ball Area entrance and make a contact using the amateur satellites. There will be AMSAT volunteers there to explain how to make the contacts and during actual satellite passes will try to get as many students as possible to complete actual contacts. There are lists of satellite pass times in the satellite demonstration area and at the AMSAT booth.

[ANS thanks Gould Smith, WA4SXM for the above information]

Silent Key: Dee Interdonato, NB2F

AMSAT has received the sad news of the passing of Dee Interdonato, NB2F on April 8, 2012. Dee was one of the editors of the AMSAT News Service and an AMSAT New Jersey Area Coordinator. He was the main point of contact for many amateurs as he covered most of the New Jersey hamfests on behalf of AMSAT. Dee was one of the mainstay volunteers for AMSAT at the Dayton Hamvention for years. He also gave satellite presentations for the clubs in New Jersey. Dee helped where ever he could, often behind the scenes. He worked on QSL duties for SAREX, ARISS, and ARISSat-1 missions so many of you have likely received a card from him.

Dee was a well known and respected mentor for amateur satellite opertors, helping them understand the technical details and make successful radio contacts via satellites.

Dee's other amateur radio activities in Northern New Jersey included the Bergen Amateur Radio Association, Bergen County CERT, AMSAT, and he was the treasurer of the Bergen County FM Association. Dee, and his wife Ginny, N2EYN always participated in the Dayton Hamvention and AMSAT Symposiums.

Dee was the principal trumpet player for the Rutherford Community Band and a member of the Waldwick and Westwood Community Bands. He was also an avid hunter and a member of the Association of New Jersey Rifle and Pistol Clubs.

Before retiring he was the supervisor of the Radio Shop of the Port Authority of NY/NJ.

The funeral was held on Friday, April 13 in his hometown of Lodi, New Jersey. In lieu of flowers memorial contributions may be made to the Vietnam Veterans of America, 8719 Colesville Rd., Suite 100, Silver Spring, Maryland 20910 or AMSAT, 850 Sligo Road, Suite 600, Silver

Spring, MD 20910.

Dee Interdonato, NB2F obituary:
http://tinyurl.com/NB2F-Obituary (santangelofuneralhome.com)

Guestbook for Dee Interdonato, NB2F
http://tinyurl.com/NB2F-Guestbook (santangelofuneralhome.com)

[ANS thanks the AMSAT Office for the above information]

April 19 California Flabob Airport ARISS Contact

ARISS technical support volunteer, Clint Bradford, K6LCS said this week that "It's a Go!" for students at the The Tom Wathen Center at the historic Flabob Airport in Jurupa Valley (Riverside County), California, for an amateur radio call from the International Space Station on Thursday morning, April 19, 2012 at 10:03AM PDT (UTC-7). The link will be via telebridge contact via IK1SLD providing the radio link to space and then connecting via phone lines with the students.

The Tom Wathen Center was chosen for this Amateur Radio on the International Space Station (ARISS) contact during an open application process in the Fall of 2011. The 10-minute live question-and-answer session will take place in Flabob's Hanger 16A conference center, and is free to the public.

To prepare for the ARISS contact, Flabob students are studying the history and mission of space station and mission control, rocket fabrication, astronaut selection and training, and mission control and station operations along with radio technology and communication topics.

An amateur radio station is operational onboard the International Space Station. Most astronauts have amateur radio licenses and operate the onboard station to contact radio amateur ground stations in their free time. Per an agreement with multiple space agencies involved with building the ISS, ARISS prepares and implements educational contacts for students - more than 120 in 2011 alone. Amateur radio operators on the ground volunteer their radio station, expertise and time to make the conversations between the students and astronauts happen. The ARISS international working group is supported by the national radio amateur societies AMSAT-NA and the American Radio Relay League (ARRL).

This ARISS contact is one in a series with educational organizations in the U.S. and abroad to improve teaching and learning in science, technology, engineering and mathematics. It is an integral component of Teaching From Space, a NASA Education office. The office promotes learning opportunities and builds partnerships with the education community using the unique environment of human spaceflight.

Clint published all of the details on the Flabob Project Web site:
http://www.iss-flabob.com.

The City of Jurupa Valley will declare the week of April 15-21 'Space Week' at their April 19, 2012 regular city council meeting acknowledging the efforts of the students at The Tom Wathen Center's Flabob Airport Preparatory Academy, who have spent months learning about space exploration while preparing for their amateur radio contact with the

ISS.

[ANS thanks Clint Bradford, K6LCS for the above information]

UT1FG/MM and K8YSE Enjoy Eyeball QSO Aboard Ship

John Papay, K8YSE had a unique experience on Easter Sunday, April 8 when he got the opportunity for an eyeball QSO with Captain Yuri Bodrov, UT1FG/MM aboard the MV Barnacle traveling from Thunder Bay, Ontario, Canada on Lake Superior en route to Puerto Rico via the Great Lakes and St. Lawrence Seaway.

Yuri has been activating wet grids as UT1FG/MM operating this year from the MV Barnacle as he sails the seas between Europe, South America, the Caribbean, and North America. Last year Yuri captained the MV Mottler on a similar sea voyage when many first met him operating on the air via the amateur radio satellites. He is the Captain of the state-of-the-art seagoing vessel with 10,000 horsepower plant.

John had an idea that he could drive from his QTH to watch as the MV Barnacle passed through the Welland Canal connecting Lake Erie and Lake Ontario. The ship would have to pass through eight locks which might put John and Yuri within shouting distance.

On Saturday night John and Yuri chatted on 144.200 sideband as the MV Barnacle sailed from the Detroit River and across Lake Erie en route toward Lake Ontario. Yuri estimated his arrival at the Welland Canal would be around 0800. John hit the road from his QTH at about 0315 Sunday morning, passed customs to enter Canada and then drove to the Lake Erie entrance to the Canal.

Sunday morning John met up with Kevin, VE3RCN/VA3OR in Port Colborne, Ontario. Radio contact was established with Yuri on 146.520 MHz. The ship came in sight along the Lake Erie shore. John and Kevin were within waving distance. As the MV Barnacle entered Lock 8 the shore party was close enough to talk with Yuri aboard the ship.

As the ship cleared the lock John and Kevin lost contact for a short time. They were able to catch up with Yuri at the next lock. As the new Canal Pilot was boarding ship John got an invitation to come aboard. John boarded as the ship lowered to the dock level. He told what happened next, "A minute later I was on the bridge with Captain Yuri UT1FG. Finally I was able to meet a guy that I've been working on the satellites in hundreds of water grids since April 2009!"

A tour of the ship included a visit to Yuri's cabin, one level below the bridge. His quarters are quite nice and private. This is where he operates with his IC706, manually tuning the radio and doing a great job at that! The power supply from HP1CQ sat on the table in the corner and a computer running Orbitron is on the other side.

Yuri now has an ELK antenna installed (thanks to the efforts of Rick, WA4NVM). It is mounted on a manually rotatable mast that goes up from the bridge, starboard side, directly above his cabin. The ELK is tilted up at 15 degrees and was just installed on the way back from Thunder Bay. A CJU antenna is mounted on the crossboom next to the ELK. A vertical for 2 meters is on a separate mast above those antennas. Until this season Yuri only used the 2 meter vertical for transmit and receive. The CJU improved things greatly and the ELK takes it to a new level. Yuri plans to install SatPC32 when he has more free time on

the open sea; passing through the St. Lawrence Seaway keeps him and his crew very busy.

John said he sailed with Yuri until Lock 2 where it was time to get back ashore. Kevin, VE3RCN/VA3OR and his XYL Donna, VE3WIZ were waiting and gave John a ride back to his car, 30 miles away in Port Colborne.

John wrote, "I want to thank Kevin VA3OR/VE3RCN and his wife Donna, VE3WIZ, for spending their Easter Sunday hosting my visit to the Canal. I'm sure they had better things to do but they decided to take me all around and make my visit a memorable one. I hope they enjoyed the day as much as I did." And a big thanks to Master Yuri Bodrov and his crew for their hospitality. It was an experience that very few will ever have."

Yuri plans to work the water grids on the way south to San Juan, Puerto Rico where he is due on April 20. The next port-of-call for Yuri and the crew of MV Barnacle is yet to be determined. Yuri will be the Captain until the end of May, 2012. If you work Yuri on the air QSL via his manager UX0FY (on qrz.com).

[ANS thanks John Papay, K8YSE for the above information]

NASA-TV Plans Coverage of April 17 Washington DC Shuttle Fly Over

NASA's 747 Shuttle Carrier Aircraft (SCA) with space shuttle Discovery mounted atop will fly approximately 1,500 feet above various parts of the Washington, D.C. metropolitan area on Tuesday, April 17.

The flight, in cooperation with the Federal Aviation Administration, is scheduled to occur between 10 and 11 a.m. EDT (UTC-4). NASA Television and the agency's web site will provide live coverage. NASA TV is streamed on the web at: http://www.nasa.gov/ntv.

The exact route and timing of the flight depend on weather and operational constraints. However, the aircraft is expected to fly near a variety of landmarks in the metropolitan area, including the National Mall, Reagan National Airport, National Harbor and the Smithsonian's Udvar-Hazy Center. When the flyover is complete, the SCA will land at Dulles International Airport.

Discovery completed 39 missions, spent 365 days in space, orbited the Earth 5,830 times, and traveled 148,221,675 miles. NASA will transfer Discovery to the National Air and Space Museum to begin its new mission to commemorate past achievements in space and to educate and inspire future generations of explorers.

For more information about NASA's transfer of space shuttles to museums, visit: http://www.nasa.gov/transition

A NASA YouTube video shows the flight of the Shuttle Carrier Aircraft:
http://www.youtube.com/watch?feature=player_embedded&v=jbcnqCmXk

Following the event NASA Goddard Space Flight Center in Maryland will publish a photo slideshow on the Goddard homepage: http://www.nasa.gov/goddard and on Goddard's Flickr page: http://www.flickr.com/groups/discoverygoddard/.

[ANS thanks NASA and Perry Klein, W3PK for the above information]

Mexico Satellite Activation for IARU Celebrating 50 Years in Space

Members of the Grupo DXXE in Mexico will use the special call 6H6IARU on 160-6 meter and via satellite from different grids between April 13 to April 18. This station marks the founding of the International Amateur Radio Union (IARU) 87 years ago and the "World Amateur Radio Day" on April 18.

This year's World Amateur Radio Day has the motto "Celebrating 50 Years in Space" with the first launches of amateur radio satellites OSCAR 1 on December 12, 1961, and OSCAR 2 on June 2, 1962.

QSOs with 6H6IARU count for the IARU Region 2 award, several FMRE awards and the DXXE award. QSL via N7RO, LoTW.
See also: http://www.dxxe.org

[ANS thanks DXNL 1775 DX Newsletter for April 11, 2012 for the above information]

Satellite Beacon Mission Suggested for Asteroid Apophis

This week UniverseToday.com carried an article about a Russian mission proposal to send a satellite with a radio beacon to asteroid 99942 Apophis to better determine its trajectory and find out how big of a threat it might be to Earth in passes the asteroid will make in 2036 and 2068.

Apophis is approximately 270 meters (885 ft) in diameter, the size of two-and-a-half football fields.

Apophis is expected to make a record-setting but harmless close approach to Earth on Friday, April 13, 2029 when it comes no closer than 29,450 km from Earth (18,300 miles). The Russian Academy of Sciences said, "From the technical point of view, the mission could be started for implementation around 2015".

Read the full story at:
http://tinyurl.com/Apophis-Beacon (UniverseToday.com)

[ANS thanks UniverseToday.com for the above information]

Russia to Build Nuclear Space Engine by 2017

In contrast to last week's ANS news item about Switzerland's EPFL University's MicroThrust ion motor which will be capable of reaching the Moon using just a tenth of a liter of fuel, a news report published on Space-Travel.com this week says a Russian Megawatt-class nuclear propulsion system for long-range manned spacecraft is under development.

Russian space officials believe that nuclear engines for interplan-

etary spaceships are a very promising area, as solar power is too weak to be used as a power source at distances beyond Earth's orbit.

The megawatt power system may be the power plant producing the high energy required for an ion thrust system capable of powering manned spacecraft to the moon, Mars, and interplanetary destinations.

NASA started a program to develop a nuclear propulsion system in 2003, and spent several hundred million dollars on the project before cutting funding.

Read the full story at:
http://tinyurl.com/Megawatt-Engine (space-travel.com)

[ANS thanks Space-Travel.com for the above information]

India's Atharva Satellite Ground-Station Inauguration

The Atharva College of Engineering, University of Mumbai in India has inaugurated the Atharva Satellite Ground-Station. Currently, they are associated with the Indian Institute of Technology, Bombay for the communication, telemetry and data acquisition of their Pratham student satellite project.

The primary aim of the Atharva Satellite Ground-Station team at the is to establish a center for the development of wireless technology and satellite communication in Mumbai. During the journey of the last three and half years, we have grown from fundamental research phase to the current phase where we have achieved full operational status.

During the formal inauguration on March 15, 2012 VU2MUE used VO-52 to communicate over a distance of 850 Miles with VU2YEP located in Delhi, the Indian Capital.

The Atharva Satellite Ground-Station Team has an objective of providing communication and telemetry services for the various satellite projects undertaken by the student satellite teams around the globe.

Student blog posted at: http://acegroundstation.blogspot.com/
Photos posted at: http://tinyurl.com/Atharva-Symposium
APRS Location: http://aprs.fi/#!call=2FAtharva&timerange600

[ANS thanks the Atharva Satellite Ground-Station Team for the above information]

CubeSat TURKSAT-3USAT in the Press

The AMSAT-UK web has a story about the Ankara based Amateur Satellite Technology Association (TAMSAT) which has received more press coverage for their new CubeSat TURKSAT-3USAT. The 3USAT is expected to launch near the end of 2012. (See: http://www.uk.amsat.org/6288)

IARU coordinated frequencies are:

+ Transponder uplink: 145.940-145.990 MHz
+ Transponder downlink: 435.200-435.250 MHz

+ CW beacon: 437.250 MHz

This cubesat is a three unit CubeSat developed for SSB/CW communications in low earth orbit. The VHF/UHF transponder and all other subsystems, except the stabilization, are doubled for redundancy. Where possible, both COTS systems and in-house development is employed.

The energy is provided using lithium polymer batteries together with super capacitors. Satellite stabilization is accomplished using passive magnetic attitude control system with hysteresis rods. The satellite is to include a de-orbiting system which will make it re-enter the atmosphere following completion of its life time.

Read the newspaper story in Google English at:
http://tinyurl.com/3USAT-PressStory

[ANS thanks AMSAT-UK for the above information]

Cuba Satellite Group (GROS) Hosts Country-wide Events

Raydel, CM2ESP reported April 13-14 was a busy weekend for Cuba's recently founded "Grupo de Radioaficionados para Operaciones Satelitales" (GROS). The events were coordinated in commemoration of the first human manned spaceflight by Yuri Gagarin the April 12, 1961, the inaugural launch of NASA's Space Shuttle on the same day of 1981 and the celebration of the 87th Anniversary of the founding of the International Amateur Radio Union, IARU, on April 18, 1925. This year the IARU theme for "World Amateur Radio Day" on April 18 is "Celebrating 50 Years in Space" with the first launches of amateur radio satellites OSCAR 1 on December 12, 1961, and OSCAR 2 on June 2, 1962.

On Friday night Hector CO6CBF hosted a talk about amateur radio satellite on Cuba's Pico San Juan 2m repeater. He gave a presentation about GROS, a brief history of amateur radio satellites, and a talk about current operational satellites. Additional topics included station requirements and equipment and operating practices. Arnaldo Coro, CO2KK, Cuba's second ham in perform a satellite QSO and Cuba's first in conduct a EME QSO was a special guest.

On Saturday morning Pavel CO7WT gave a talk at Camag[illegible]ey City Amateur Radio Club. His presentation also included information about GROS, satellite status, equipment and operating techniques, orbital mechanics, and a discussed how to set up a APRS/Beacon Packet station using the ISS digipeater.

[ANS thanks Raidel Abreu Espinet, CM2ESP for the above information]

Satellite Shorts From All Over

+ AMSAT's Fox-1 Paypal donation widget went over the $6000 mark on Saturday, April 14! Thank you for your generous support.

+ The NASA SkyWatch 2.0 Java applet shows when visible ISS passes worldwide are happening. The applet runs in your browser window.
1. http://spaceflight.nasa.gov/realdata/sightings/

2. Click Start Applet (some systems may require Java upgrade)
3. When Skywatch starts click on your continent.
4. Then click on nearby city. Use the buttons to select how you want your data reported.

+ The SA AMSAT Space Symposium will be held at the University of KwaZulu-Natal on Saturday 12 May. The theme of the symposium is 50 years of amateur satellites celebrating the launch of OSCAR 1 fifty years ago. The full program and registration details are at: http://www.amsatsa.org.za/SpaceSymposium2012.htm

+ It is time to submit nominations for the upcoming open seats on the AMSAT-NA Board of Directors. Three directors and two alternate directors have terms expiring this year. The director seats open for election are held by Tom Clark, K3IO; Lou McFadin, W5DID; and Gould Smith, WA4SXM. The alternate director seats open for election are held by Mark Hammond, N8MH and Patrick Stoddard, WD9EWK. The AMSAT front page news at http://www.amsat.org has the instructions to submit your nominations.

+ The Ararat Shrine Hambash in Kansas City, Missouri will be on Saturday, April 21, 2012. Appearing again at this year's Hambash will be Hams in Space, the team of Randy Schulze - KD�HKD, Eddy Paul - KY�F, and Jeremy Widner, K�PDX, formerly known as the KC Amateur Radio Satellite Team. They've dusted off and revised their informative and entertaining presentation on how to work the FM Amateur Radio Satellites for the 2012 Season. The Hambash will be held at 5100 Ararat Drive, Kansas City, Missouri 64129. More information: http://www.hambash.com. http://HamsInSpace.com explains how you can schedule the Hams in Space Team to provide their informative and entertaining presentation to your amateur radio group.

+ As the ISS orbited 240 miles (386 km) above Volgograd, the Expedition 30 crew captured a photo of Moscow at night. Check it out at: http://www.universetoday.com/94503/moscow-at-night/

+ The night lights of Ireland and England are visible in this photo from the ISS: http://www.spaceref.com/news/viewsr.html?pid@545

+ While we're looking out of the window on the ISS ... Soyuz and Progress spacecraft are still lit by the setting sun as the International Space Station flies over Europe at night: http://www.spaceref.com/news/viewsr.html?pid@557

+ NASA Goddard Space Flight Center posted a movie captured by the STEREO spacecraft showing coronal mass ejections slamming into Mercury. In this movie the Sun is just to the left of the field of view and the Earth would be millions of miles to the right. Mercury is the bright object moving from right to left against the background of stars near the center of the images. Watch the rough weather on the first rock from the sun at: http://www.flickr.com/photos/gsfc/6915235340/

+ Enjoy a photo tour of the cockpit of the space shuttle Endeavour on the SpaceFlightNow web at: http://spaceflightnow.com/shuttle/sts134/poweron/

+ Keep Spaceport Gagarin in mind for future vacation plans. Russia is building the facility as a part of entertainment resort Vazuza and Yauza Park, being built in Smolensk region, 200 kilometers from Moscow. It will host museums, entertainment facilities, exhibitions and tours for Russian and foreign guests, especially children. More details at: http://tinyurl.com/Spaceport-Gagarin

+ Southgate ARC site has a news item about a 2007 Japan-Broadcasting Corporation TV report about amateur radio Moonbounce (EME) 8N1EME Big Dish operation. Watch the EME contacts at: http://tinyurl.com/8N1EME-NHK (Southgate)

+ Visit the AMSAT-UK web at http://www.uk.amsat.org/6432 for links to download the free April, 2012 issue of SatMagazine. The student built Hiscock Radiation Belt Explorer (HRBE) amateur radio CubeSat formerly known as Explorer-1 [PRIME] is featured on page 10.

+ Eric Knaps, ON4HF posted NOAA APT satellite pictures that he received with his FunCube dongle at: https://picasaweb.google.com/ON4HF.Eric/NOAAWeatherPictures

[ANS thanks everyone for the above information]

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information. And with that please keep in mind the memory of ANS Editor Dee Interdonato, NB2F who became a Silent Key this week. This was Dee's week for the bulletins. Take a moment and wish him 73 and offer thanks for all Dee did for AMSAT.

73,
This week's ANS Editor,
JoAnne Maenpaa, K9JKM